



Kyrgyzstan: Power Generation & Transmission

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SUMMARY

This report describes the power sector of the Kyrgyz Republic, including the infrastructure, potential developments and export possibilities. It also describes the government initiatives in the sector and outlines opportunities for US companies and provides sector contacts.

POWER SECTOR OVERVIEW

Infrastructure

Kyrgyzstan has abundant hydro resources and 90% of energy produced is hydroelectric. Nevertheless only 10% of its potential has been developed. Power generation sector comprises 3.9% of GDP and 16% of total industrial production. The total number of customer accounts is estimated at 1.08 million, where 95 % of them are residential consumers.

Kyrgyzstan has 18 power plants: 16 Hydroelectric and 2 thermal power plants. Total installed capacity is 3,713 MW, of which 2,950 MW (79.5%) is hydroelectric and 763MW (20.5%) is thermal. Hydropower units of the Totktogul reservoir and those in the downstream Naryn cascade account for 97% of the hydro capacity and 78% of the total installed power generation capacity in the country. They also account for over 90% of some 11 to 15 billion kW/h per year of the total electricity production in the country. The remaining 2 thermal power plants, fueled by gas, fuel oil and coal, generate only 1.1 to 1.2 billion kW/h per year, though their projected production capacity was 4.1 billion kW/h.

Electricity grid of Kyrgyzstan combines more than 10,000 km of power transmission lines of 35kV or greater and over 58,000 km of 0.4-10kV lines. There are over 500 working substations of 35-500kV capacity.

All 16 of existing Hydro Power Plants (HPPs) are heritage from the Soviet times. They are in poor condition and in need of repair because of lack of maintenance in previous years. Around \$180 million may be required for these upgrades. The description and location of main hydro power plants is depicted below:

	Existing HPPs	Capacity (MW)	Guaranteed Capacity (MW)	Average Annual Electricity Production (Millions KWh per year)
1	Toktogul	1200	260	4,400
2	Kurpsay	800	164	2,630
3	Tash-Kumyr	450	150	1,555
4	Shamaldy-Say	240	80	900
5	Uch-Kurgan	180	45	820
6	At-Bashy	40	12	160
	Total	2910	711	10,465
	Hydro Potential			163,000

Source: Electric Power Plants JSC, www.energo-es.kg; Electricity beyond Borders/Forum Briefing Book, USTDA, 2006

Table 1. Existing Hydro Power Plants (HPPs)

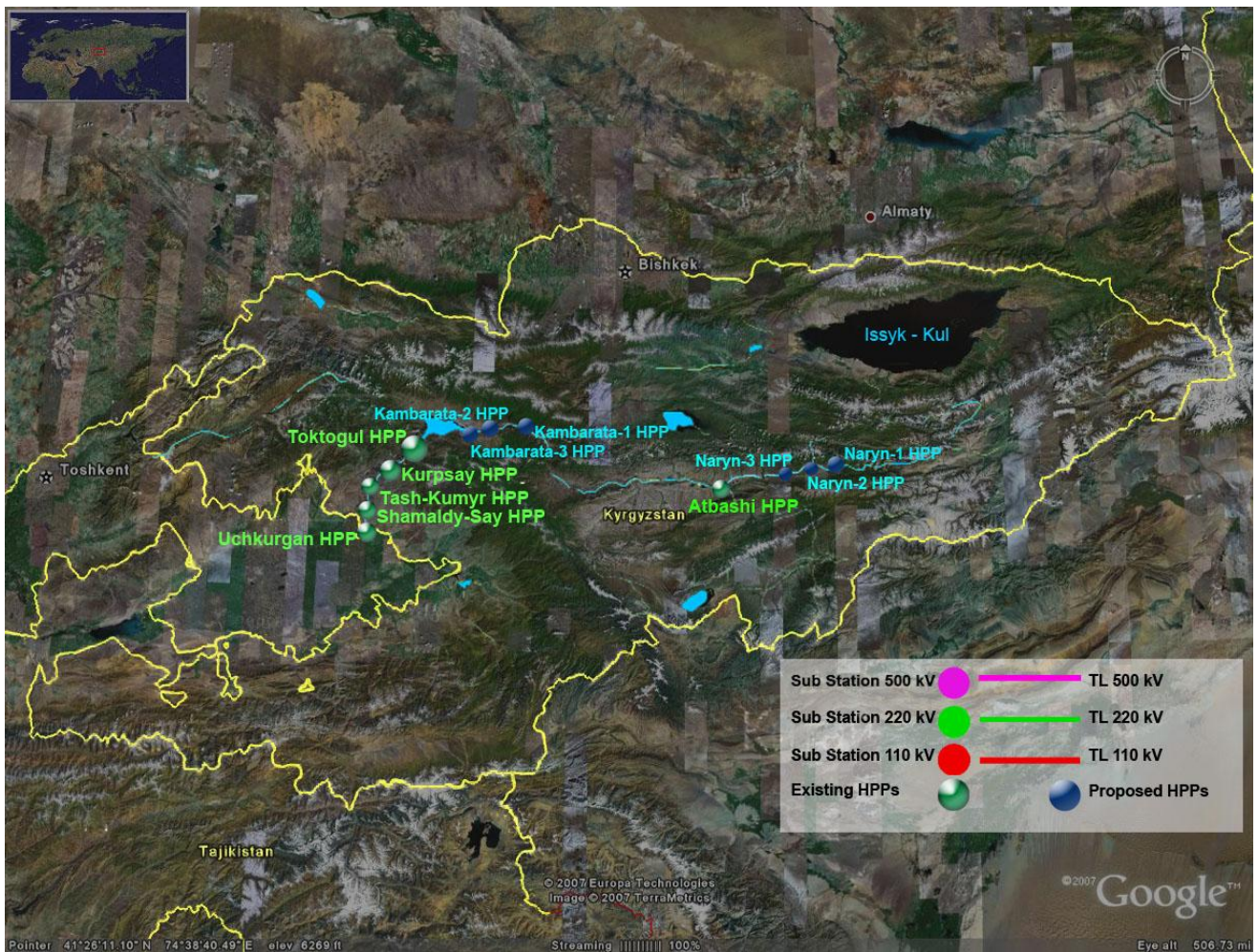


Figure 1. Existing and Proposed HPPs

Production, Demand and Export Potential

In 2009 Kyrgyzstan produced 10.9 billion kWh of energy, of which more than 90% was hydroelectric. Around 9% of the total generation was exported to Kazakhstan and Uzbekistan. Imports are incremental and are mainly needed for system stability and balancing purposes, though the Kyrgyz government had to purchase increased amounts of additional power in 2008 because of shortage of electricity.

Net supply to the domestic market amounted to about 10 billion kWh in 2009, but domestic sales amount to only 6.9 billion kWh, implying a system loss level of about 31% of the net supply. Since the Toktogul reservoir provides multi-year storage facility for irrigation and agriculture in the downstream countries, water releases from it are subject to annual Inter-Governmental Irrigation Agreements (IGIA). This leads to substantial release of water and export of electricity in summer and limited release of water and import of fuels in winter. Thus to a large extent, trade in electricity is inter-connected with water release agreements.

On the demand side, the structure of consumption has changed substantially compared with 1990. Industrial consumption declined sharply and the share of the residential consumers rose from 15% to about 60% of the total consumption.

Residential consumers increased electricity consumption because of increase in the price of imported fossil fuels led them to switch from fossil fuels to electricity for space heating, cooking and hot water, encouraged by the continued low and highly subsidized price of electricity. Around 2/3 of the annual electricity consumption takes place in the first and the fourth quarters of the year (winter and fall) as a result of the increased heat demand.

Kyrgyzstan has been struggling to provide enough electricity to meet domestic demand. Export of electricity is lucrative for the government, because the price is higher than electricity sold domestically, while local supply creates a deficit primarily because of low tariffs and inefficient collection system. While the electricity industry deficit has shrunk by almost a half over the past four years (see table 2), it is primarily because of more profitable exports and decreased net supply of electricity to the local market.

While the amount of exported electricity has decreased by 60% since 2006, the revenues from export of electricity in 2009 increased by 60% compared with 2006. This is primarily due to a fourfold increase in the export price of electricity.

	2006	2007	2008	2009
Electricity Production				
Total production (KWh)	14,523,200,000	14,830,400,000	11,789,100,000	10,889,368,909
Total estimated actual revenue (USD)*	\$ 136,931,041	\$ 158,763,368	\$ 160,734,718	\$ 153,641,938
Total estimated cost of production & supply (USD) *	\$ 363,080,000	\$ 370,760,000	\$ 294,727,500	\$ 272,234,223
Estimated Electricity Industry Deficit (USD)*	\$ 226,148,959	\$ 211,996,632	\$ 133,992,782	\$ 118,592,285
Exports				
Exports (KWh)	2,460,200,000	2,379,200,000	552,000,000	986,671,400
Exports Total (USD)	\$ 25,076,600	\$ 32,477,800	\$ 25,105,400	\$ 39,789,600
Average Export Price (US cents/kWh)	1.02	1.37	4.55	4.03
Local Market				
Total Local Electricity supply (KWh)	12,063,200,000	12,451,400,000	11,244,100,000	10,025,309,809
Local rate for electricity (US cents/KWh)	1.57	1.69	1.94	1.66
Actual estimated revenues from local supply (USD)*	\$ 111,854,441	\$ 126,285,568	\$ 135,629,318	\$ 113,852,338
Losses				
Losses (KW/h)	4,666,800,000	4,582,000,000	3,693,000,000	3,092,412,500
Losses/Production ratio (%)	32%	31%	31%	28%
Imports				
Imports (KWh)	200,000	200,000	6,900,000	-

*- Estimated

Source: National Statistics Committee, Kyrgyz Customs.

Table 2. Electricity balance, estimated industry revenues and deficit.

In 2010 the capacity of the Toktogul reservoir has reached its peak level of 19.5 billion cubic meters. Because of this, Kyrgyzstan plans to export 3.29 billion KW/h of electricity in 2010, most of which will go to Kazakhstan. The price for this exported electricity though, was set at only 2.8 US

cents/KWh, which is significantly lower than in previous two years with an average tariff of roughly 4.5 US cents/KWh.

In terms of the development of unexploited potential, Kyrgyzstan inherited multiple unfinished projects from the Soviet Union. These unexploited resources, if the projects are completed, represent significant opportunities for export of electricity in the future.

The Kyrgyz government has proposed two transmission line construction projects: the construction of the Datka-Kemin 500kV Transmission Line that will connect the northern region to the Datka Substation in the South, and the Southern Kyrgyzstan Transmission Upgrade Project. These projects will decongest loaded unbalanced lines and enhance self sufficiency. These transmission projects would also be important if the proposal to export electricity from Central Asia to South Asia were to become finalized.

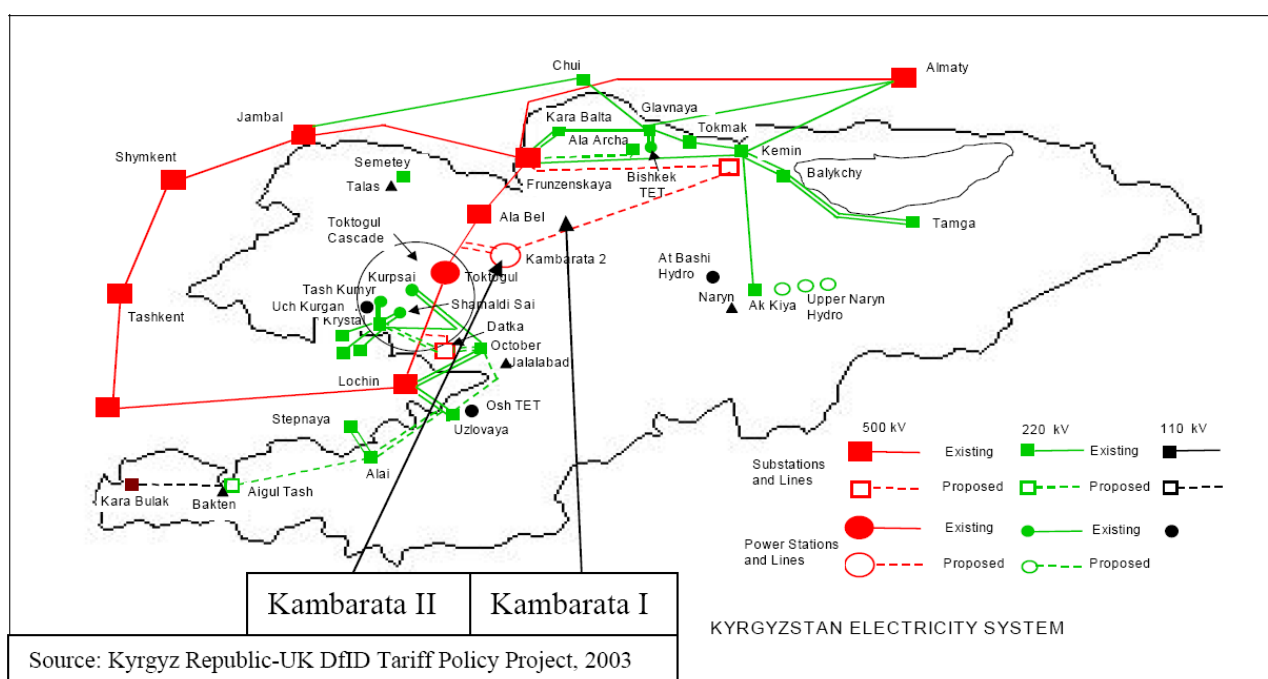


Figure 2. Electrical Grid and potential transmission lines.

Sector Structure and Private Sector Participation

The Ministry of Energy is responsible for day to day operations as well as development of the industry as a whole.

Operational responsibilities are carried out by the following companies:

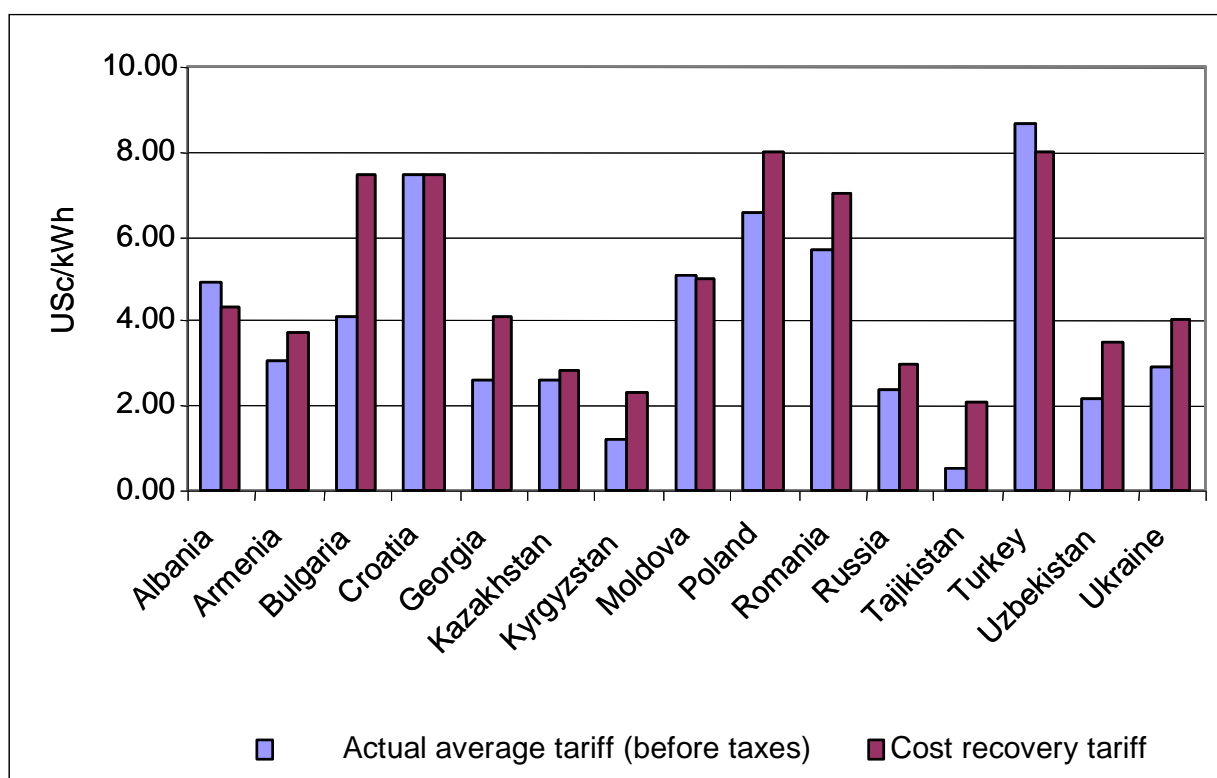
- "Electric Power Plants" JSC holds all power plants,
- "National Electrical Grid of Kyrgyzstan" JSC controls the transmission system
- Four regional distribution companies: Sevelelectro JSC, Vostokelectro JSC, Oshelectro JSC and Jalalabadelectro JSC, and
- One District Heating Network company for Bishkek, Bishkekteploset JSC.

Private sector participation in the Power industry is still marginal. The Kyrgyz Government conducted controversial privatization of the two largest distribution companies – Severelctro JSC, and Vostokelectro JSC, which were sold to ChakanGes in the beginning of 2010. The government that came to power in April 2010 opposed the privatization and it is currently under the dispute.

Electricity Tariffs

According to Electric Energy Law of Kyrgyzstan, it is specifically stated that power price should cover the cost of electric generation, transmission and distribution and should not allow one group of consumers to be subsidized at the expense of another. Despite this provision, Government has highly subsidized the power sector, and consequently the tariffs for electricity in Kyrgyzstan are substantially lower than the cost recovery level. Due to a combination of low tariffs and high levels of commercial losses, the distribution companies have insufficient funding to undertake anything except emergency repairs, and therefore, none of the needed capital expenditure has taken place. This is leading to a steady decline in the integrity and reliability of the network together with a corresponding increase in technical losses.

Figure 3 depicts the difference between the tariff and the cost recovery level in Kyrgyzstan and other countries.



Source: Electricity beyond Borders/Forum Briefing Book, USTDA, 2006

Figure 3. Tariff comparisons by country

The principles of the tariff policy for electricity and heat were first adopted by the government in 1998. Since then, the government has changed the tariff policy several times, with a gradual switch from the principle of socially-protected costs to the principle of profitability and efficiency. The basic principles of the tariff policy are presently aimed at preparing the ground for further reforms in the power sector.

In January 2010, the government doubled tariffs for electricity to 3.3 cents/KWh, and stated this would provide for cost recovery and some additional funds for development of the industry. This policy was largely unpopular and contributed to the overthrow of the government in April, 2010.

Tariff structure by Function (US cents/kWh)		
<i>Function</i>	<i>International</i>	<i>Kyrgyzstan</i>
Generation	3.5	0.5
Transmission	0.5	0.2
Distribution	2	1.8
Total	6	2.5

Source: Electricity beyond Borders/Forum Briefing Book, USDA, 2006

Table 3. Tariff structure

The new government brought the electricity tariffs back to their previous level of 0.7soms/KWh or roughly 1.5 US cents/KWh. It is still far from the cost recovery level of 2.5 US cents/kWh. Tariffs for commercial enterprises will remain at roughly 3.3 US cents/KWh.

Government Initiative

Developing the electricity sector of the Kyrgyz Republic has been one of the government's top priorities for the past few years. The government has started the construction of Kambarata II power plant (see Figure 1 for location) with targeted capacity of 360 MW. Only one turbine out of three is due to start electricity generation in October of 2010. The projected cost is estimated at \$270 million. The doubling of electricity tariffs was supposed to create some funds for financing the remaining construction of the plant. With the reduction in tariffs, funding for the remainder of the project is now under question.

In February, 2009 Kyrgyz Government also made an arrangement with Russia on providing a long-term loan of \$1.7 billion for the construction of Kambarata I hydro power plant, with estimated capacity of 1900 MW, but this loan has not been disbursed.

With most electricity being produced in the south, while 70% of the load is in the north, the government has been struggling to find investors for construction of two transmission line projects (Datka-South & Datka-Kemin), which would decongest the grid and would guarantee the system security for Kyrgyzstan. The Kyrgyz government is in discussions with the Chinese government regarding financing of these projects.

On July 20, 2010 the President signed a decree on Fuel-Energy Sector Transparency Initiative, which should allow for more transparent export and fuel procurement, as well as improved public accountability.

OPPORTUNITIES FOR US COMPANIES

There are multiple opportunities for US companies in the power sector of Kyrgyzstan. Some of the major potential projects are listed below.

1. 500kV Datka-Kemin Transmission Line and Substations.

Project Cost: USD 190 million

US Export Potential: USD 103 million

US companies can potentially export the equipment (from automatic circuit breakers to power transformers) and services (from electrical designs to environmental assessments).

Description: This project incorporates construction of 500kV Datka – Kemin Transmission Line, 400 km with 500kV / 220kV Kemin Substation. Government of Kyrgyzstan defined this project to connect generation in the south to demand in the north of the country. Additionally this project includes construction of a substation that will integrate the planned Kambarata Hydropower Plant to the 500kV electrical grid.

2. Southern Kyrgyzstan Transmission Upgrade Project

Project Cost: USD 55 million

US Export Potential: USD 40 million

US companies can potentially export the equipment (from automatic circuit breakers to power transformers) and services (from electrical designs to environmental assessments).

Description: The project incorporates the construction of a 500/220kV substation at Datka with interconnection to the existing 500kV O/H Transmission Line and the construction and replacement of several 220kV transmission lines old and in need of rehabilitation. Benefits of this project include relief of current overloading (25-30% during winter high demand), self-sufficiency of supply and control of the Southern Transmission system. Additionally there would be a better and more efficient transmission and increased reliability of service to many southern towns which are often left without electricity during winter.

3. Upgrading of Uch-Kurgan Hydropower Plant

Project Cost: USD 35 Million

US Export Potential: USD 30 million

US Companies can potentially export equipment (from turbines to generator) and services (from environmental assessments to construction management).

Description: Uch-Kurgan HPP was built in 1962 and is in need of modernization of equipment. Lack of action will result in further decrease of installed capacity, and consequently to shutdown of HPP. The project envisages improving downstream water quality by replacing the existing Kaplan turbines that are leaking oil into the river and increasing the installed capacity by 40MW by installing more efficient turbine generating units.

4. Greenfield Hydropower Plants on Naryn Cascade

Project Cost: USD 350 million to USD 420 million

US Export Potential: USD 210 million to USD 250 million

Description: The project envisages design and construction of 5 or more hydroelectric plants with a total generating capacity of approx. 350MW. The project's goal is to stimulate new export-based power generation projects and foster private sector participation in Kyrgyz power generation on a concession basis.

USEFUL CONTACTS

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